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David Eyers · Spyros Voulgaris (Eds.)

Distributed Applications and Interoperable Systems

22nd IFIP WG 6.1 International Conference, DAIS 2022
Held as Part of the 17th International Federated Conference on Distributed Computing Techniques, DisCoTec 2022
Lucca, Italy, June 13–17, 2022
Proceedings

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Editors
David Eyers
University of Otago
Dunedin, New Zealand

Spyros Voulgaris
Athens University of Economics
and Business
Athens, Greece

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Foreword

The 17th International Federated Conference on Distributed Computing Techniques (DisCoTec 2022) took place during June 13–17, 2022. It was organized by the IMT School for Advanced Studies Lucca, Italy. The DisCoTec series is one of the major events sponsored by the International Federation for Information Processing (IFIP) and the European Association for Programming Languages and Systems (EAPLS). This year's event comprised three conferences:

- COORDINATION, the IFIP WG 6.1 24th International Conference on Coordination Models and Languages;
- DAIS, the IFIP WG 6.1 22nd International Conference on Distributed Applications and Interoperable Systems; and
- FORTE, the IFIP WG 6.1 42nd International Conference on Formal Techniques for Distributed Objects, Components, and Systems.

Together, these conferences covered a broad spectrum of distributed computing subjects, ranging from theoretical foundations and formal description techniques to systems research issues. As is customary, the event also included several plenary sessions in addition to the individual sessions of each conference, which gathered attendants from the three conferences. These included joint invited speaker sessions and a joint session for the best papers from the respective three conferences.

Associated with the federated event, four workshops took place:

- DisCoTec Tools, a tutorial session promoting mature tools in the field of distributed computing;
- BlockTEE 2022, the First International Workshop on Blockchain Technologies and Trusted Execution Environments;
- CoMinDs 2022, the First International Workshop on Collaborative Mining for Distributed Systems;
- FOCODILE 2022, the 3rd International Workshop on the Foundations of Consensus and Distributed Ledgers; and
- ICE 2022, the 15th International Workshop on Interaction and Concurrency Experience.

Finally, in the context of the federated event, five tutorials were offered:

- An introduction to Spatial Logics and Spatial Model Checking;
- A Gentle Adventure Mechanising Message Passing Concurrency Systems;
- Smart contracts in Bitcoin and BitML;
- The ΔQ Systems Development Paradigm; and
- ChorChain: a Model-driven Approach for Trusted Execution of Multi-party Business Processes on Blockchain.

I would like to thank the Program Committee chairs of the different events for their help and cooperation during the preparation of the conference, and the Steering Committee and Advisory Boards of DisCoTec and its conferences for their guidance and support. The organization of DisCoTec 2022 was only possible thanks to the dedicated work of the Organizing Committee, including Letterio Galletta (chair of the local organizing committee), Marinella Petrocchi and Simone Soderi (members of the local organizing committee), Francesco Tiezzi (workshops and tutorials chair), Giorgio Audrito (publicity chair), and all the students and colleagues who volunteered their time to help. I would also like to thank the invited speakers for their excellent talks. Finally, I would like to thank IFIP WG 6.1 and EAPLS for sponsoring this event, Springer's Lecture Notes in Computer Science team for their support and sponsorship, EasyChair for providing the reviewing framework, and the IMT School for Advanced Studies Lucca for providing the support and infrastructure to host the event.

June 2022 Rocco De Nicola

Preface

This volume contains the papers presented at the 22nd IFIP International Conference on Distributed Applications and Interoperable Systems (DAIS 2022), sponsored by the International Federation for Information Processing (IFIP) and organized by IFIP WG 6.1. The DAIS conference series addresses all practical and conceptual aspects of distributed applications, including their design, modeling, implementation, and operation; the supporting middleware; appropriate software engineering methodologies and tools; and experimental studies and applications. DAIS 2022 was held during June 13–17, 2022, in Lucca, Italy, as part of DisCoTec 2022, the 17th International Federated Conference on Distributed Computing Techniques.

We offered three distinct paper tracks: full research papers, full practical experience reports, and work-in-progress papers. We received 19 initial abstract submissions, 16 of which were for research papers, one for a practical experience report, and two for work-in-progress papers. All submissions were reviewed by three to four Program Committee (PC) members. The review process included a post-review discussion phase, during which the merits of all papers were discussed by the PC. The committee decided to accept nine full research papers, one full practical experience report, two work-in-progress papers, and an invited paper.

The accepted papers cover a broad range of topics in distributed algorithms, scalability and availability, stream processing, privacy, distributed ledgers, and trusted hardware.

The conference was made possible by the hard work and cooperation of many people working in several different committees and organizations, all of which are listed in these proceedings. In particular, we are grateful to the PC members for their commitment and thorough reviews, and for their active participation in the discussion phase, and to all the external reviewers for their help in evaluating submissions. Finally, we also thank the DisCoTec general chair, Rocco De Nicola, and the DAIS Steering Committee chair, Luís Veiga, for their constant availability, support, and guidance.

June 2022

David Eyers
Spyros Voulgaris

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